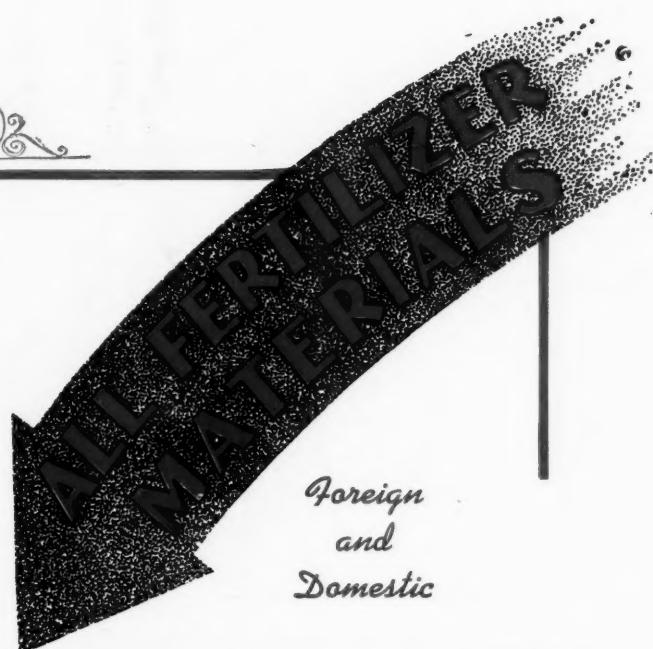


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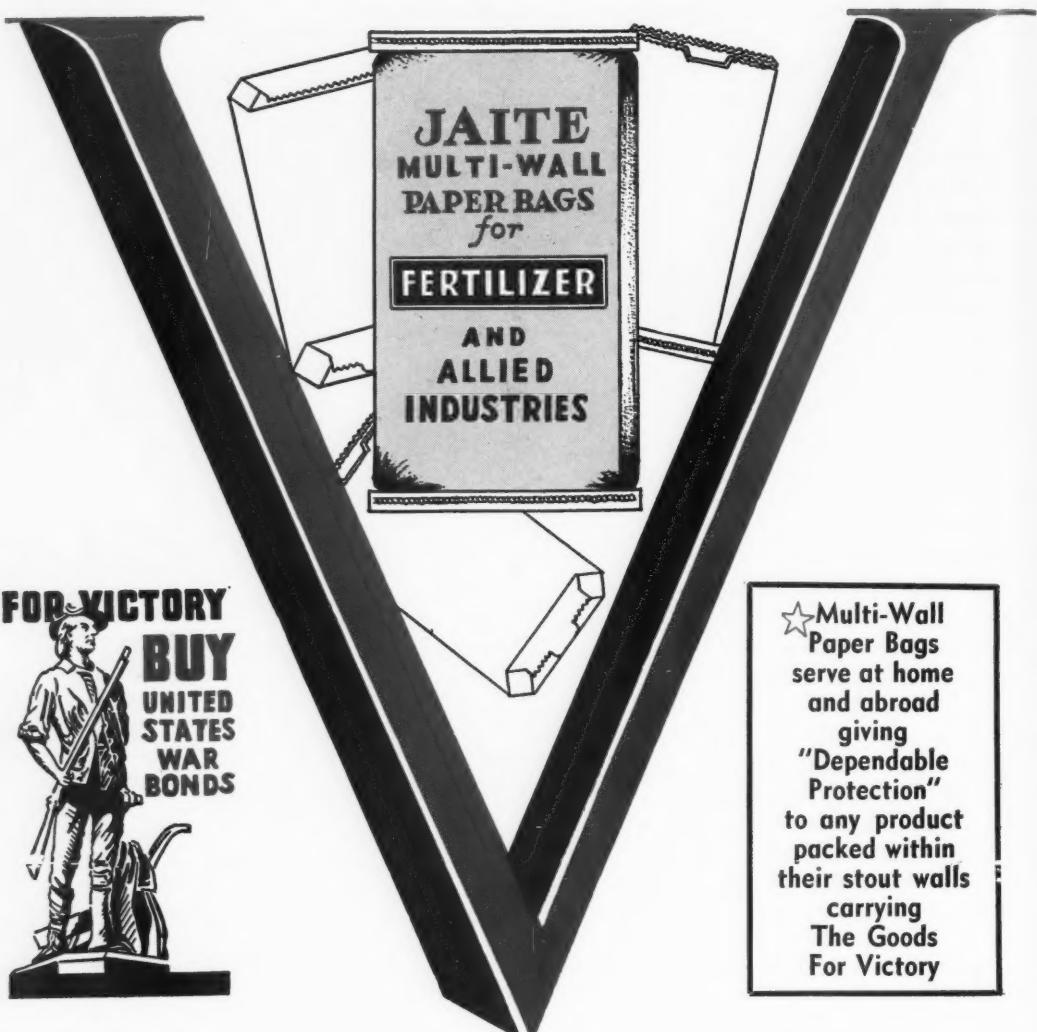
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See page 25



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"That man is a benefactor to his race who makes two blades of grass to grow where but one grew before."

Vol. 103

AUGUST 11, 1945

No. 3

Alfalfa—The Aristocrat*

By FIRMAN E. BEAR

Head, Soils Department, Rutgers University, New Brunswick, New Jersey

IN KANSAS, without benefit of added lime or fertilizer, alfalfa may be practically a permanent crop. In New Jersey, even though the land may have been liberally limed and fertilized, the life-span of this legume is often only three or four years, and all too frequently the crop fails during its first winter. The explanation of this difference in the longevity of alfalfa lies in the soil of these two states. The difference between the soil of Kansas and that of New Jersey is explained by the fact that they are the products of two fundamentally different types of climate. Kansas soil has not been subjected to the leaching action of such heavy rainfall as occurs in New Jersey. Furthermore, a much larger percentage of Kansas' 15 to 40 inches of annual rainfall goes up in vapor than of the 40 to 50 inches that fall on New Jersey.

Thrives on Rich Soils of Semi-Arid Areas

The alfalfa plant is believed to have had its origin in a relatively dry area, possibly in Persia. There it had adapted itself not only to a semi-arid climate but to the kind of soil associated therewith. A characteristic feature of soil formed under such climatic conditions is its abundant supply of all the mineral elements that plants like alfalfa require, including plenty of lime.

As civilization spread westward from the Orient around the Mediterranean Sea, alfalfa went along, but it continued to cling to the edge of the desert where the soils were rich in mineral nutrients. In due time, this famous

forage-crop made its way to Spain and Portugal, and from there it crossed the Atlantic to find a new home in the semi-arid and irrigated arid lands of Mexico and Southern California. Once the American farmer saw alfalfa he wanted to grow it, so the crop moved quickly on to Kansas, Nebraska, and the Dakotas. From there on the rate of movement of alfalfa gradually slowed down, however, until finally it was reduced to a mere snail's pace as it approached the shores of the Atlantic.

Favors Limestone Soils of Humid Areas

Here and there alfalfa was an immediate success, even as far east as New England, once the problem of soil inoculation had been solved and the necessary bacteria had been transplanted with the seed. Examination of the soils of such areas usually revealed an underlying deposit of limestone, lime-bearing shale, or calcareous till. Once the roots had penetrated to that depth and the plant was abundantly supplied with the necessary lime and mineral elements upon which it so largely depends, it grew luxuriantly.

But in trying to make alfalfa feel at home in the eastern states, we had the handicap of centuries of heavy rainfall, badly leached, acid soils, and rugged winter climate with freezes and thaws that tended to pull the plant out of the ground, leaving it lie with its head down and its taproot bent in a semi-circle above the surface of the soil. Our greatest difficulty, however, was not so much the bad weather as the generally low content of lime, phosphate, potash, and other mineral

* Reprinted from "Better Crops with Plant Food."

nutrients, both in the surface soil and in that beneath.

It was necessary, therefore, to get rid of the acid in our soils and to supply a large part of the many mineral elements this aristocratic legume requires. It must be kept in mind that alfalfa is accustomed not only to luxury feeding and well-drained soils, but to subsoil conditions that permit its roots to continue downward into the subsoil for long distances without damage either by reason of acidity or lack of aeration. The "tall" stories of Kansas include some famous ones about alfalfa roots that grew down to depths of 125 feet or more. These could be cut in half and still be "tall" enough to meet our requirements. Suffice it to say that alfalfa taproots are much longer in Kansas than they are in Pennsylvania and points east.

Has High Potash Requirement

Second only to having enough lime in the soil and subsoil, our most troublesome nutritional problem is that of keeping it supplied with potassium. The plant has a phenomenal capacity to consume this element. In fact, its tendency in that direction is such that it uses much more than it actually needs, substituting the potassium for calcium and magnesium in certain of its functions in the plant. This does not necessarily result in any lowering in yield, but it is to the disadvantage of the soil's supply of this element and of the animals to which the crop is fed. But the alfalfa plant is concerned only with its own interests, and not those of the land on which it grows or of the livestock that consume it.

Our studies have led us to believe that the life-span of this plant is frequently determined by the dosage of potassium applied in preparation for seeding. Thus, in spite of the tendency of alfalfa to overindulge in this element, we find it desirable to apply from 500 to 1,000 pounds of a 5-10-10 fertilizer per acre at seeding time as an aid in getting the little seedlings well under way with a luxuriant growth of both tops and roots before winter sets in. Plants so fed may contain as much as 4 per cent potassium, which is about four times as much as they actually need. This extra supply of the element, however, stands them in good stead during the trying days of their first winter and early spring.

Requires Phosphate-Potash Top-dressing

Once the alfalfa plant gets well under way, it then becomes highly important to give it regular and generous doses of potassium every year to prevent the soil's supply of this

element from being exhausted to the point where its lack limits growth. Here again, our experience indicates a need to apply between 500 and 1,000 pounds of an 0-12-12 fertilizer, or its equivalent, as a top-dressing every year.

During the long winter months, however, considerable amounts of soil potassium become available to the alfalfa. This is picked up by the first crop of the season and harvested with it, with great likelihood that the second crop will suffer for want of this element. Certainly by the time two crops have been harvested during any one season the soil's supply of this element is likely to be at a very low level. Thus, it is common experience to see the characteristic white-spotted leaves that betray the plant's need for potassium during the latter part of the summer. It is our opinion, therefore, that the phosphate-potash top-dressing should not be applied either in early spring or late fall, but during the summer, probably just after the first crop has been harvested.

Lives Longest on Well-Limed Soils

If one wants to keep a field in alfalfa for 8 or 10 years in the acid-soil areas of the eastern part of the United States, he must be sure that the lime needs of the soil have been abundantly satisfied before the seed are sown. The movement downward of any additional lime that might subsequently be applied as a top-dressing is often too slow to permit correcting the acidity as rapidly as it develops in the subsoil.

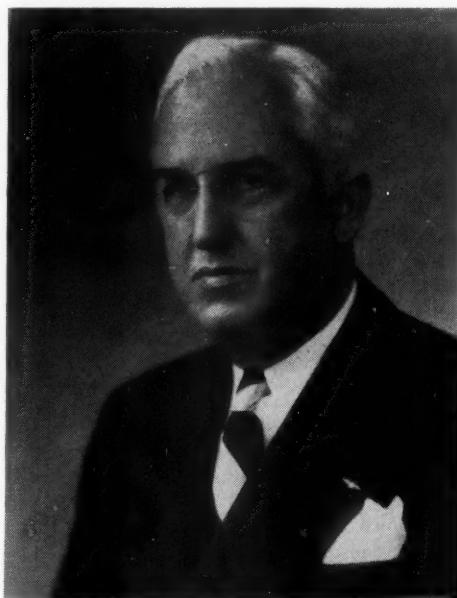
The case for phosphorus is somewhat similar to that of lime, this element being fixed at its point of contact with the soil, with very little movement downward. Nevertheless, top-dressings of superphosphate are often highly effective on phosphate-deficient soils. Presumably the roots are able to absorb the applied phosphate during periods of soaking rains and, once absorbed, the element moves both downward into the deeper roots and upward into the tops, more or less in proportion to their needs for it.

Potassium top-dressings present no serious problem. The element moves downward fairly readily into the root zone during periods of rainfall, especially if the fertilizer is applied in the summer or early fall after the soil has undergone the usual granulation processes that permit of more rapid internal movement of air and water. Thus, no difficulty whatever is experienced in removing signs of potassium-deficiency from the leaves of alfalfa plants in season of normal rainfall by top-

(Continued from page 28)

Woodrum Appointed Head of Plant Food Council

Directors of the American Plant Food Council announced July 31st the appointment of Clifton A. Woodrum, member, U. S. House of Representatives from the Sixth District of Virginia, as President of the Council, the appointment to take effect on September 1st. Simultaneously, Mr. Woodrum announced he would not seek re-election to the House of Representatives next year, and that he would retire when he was able to complete the Congressional duties in which he is now engaged.



CLIFTON A. WOODRUM

President, American Plant Food Council

Recently voted as one of the five ablest men in Congress in a poll of some 53 Washington newspaper correspondents, Mr. Woodrum served with distinction in the House for 23 years. Born in Roanoke, Va., in 1887, he studied law at Washington and Lee University and practiced in Roanoke for some 10 years. He became the successful Democratic candidate for Congress in 1922.

In 1917 he was elected Commonwealth's Attorney which office he held until August, 1919, when he was unanimously chosen to occupy the bench of the hustings court of the

City of Roanoke, which he held until elected to Congress.

A life-long Democrat and a vigorous supporter of the Administration's foreign policy, Mr. Woodrum has not hesitated to criticize unnecessary Government expenditures and has become a recognized leader in the field of Government economy. He is ranking member of the powerful Committee on Appropriations. For some years before Pearl Harbor he was active in urging military preparedness for this country, and in March, 1944, was selected by the House leadership as Chairman of the Select Committee on Postwar Military Policy.

Mr. Woodrum has two children—Major Clifton A., Jr., of the U. S. Marine Corps, and a daughter, Martha Anne. He is a thirty-third degree Mason, Past Potentate of Kazim Temple, A.A.O.N.M.S., and a member of other fraternal orders. (We also understand he has a very fine tenor voice.)

Formation of the American Plant Food Council, representing all divisions of the fertilizer industry, including farmer cooperatives, was for the purpose of achieving "a more abundant and economical production and distribution of fertilizers by keeping the ownership and operation of such facilities in the hands of private enterprise."

As head of the Council, Mr. Woodrum will be in charge of a program which has two particular objectives: (1) to promote a better relationship and understanding between the industry, the Government and the public; and (2) to provide an educational service, in cooperation with the appropriate Government agencies, to inform the farmers of the nation and the fertilizer industry as to the plant food needs of agriculture.

The Council will shortly open its offices in the Union Trust Building in Washington, D. C. Its Executive Committee is composed of the following: Horace M. Albright, Vice-President and General Manager, U. S. Potash Company, N. Y.; Ralph B. Douglass, Smith-Douglass Company, Norfolk, Va.; Thomas E. Milliman, General Manager, Grange League Federation, Ithaca, N. Y.; John E. Sanford, President, Armour Fertilizer Works, Atlanta, Ga.; J. Albert Woods, President, Chilean Nitrate Sales Corporation, New York.

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When Lend-Lease Declines

Farm products have been very substantially influenced by lend-lease arrangements of this with other countries. In 1939 domestic exports were around 3 billion dollars; in 1944 they had risen to over 14 billion dollars, of which 11.3 billion dollars were financed through lend-lease and 2.8 billion dollars through non-lend lease channels. It will be noted that non-lend-lease trading in 1944 was less than it was in 1939.

Imports for consumption, of course, have increased much less than exports. They rose, however, from 2 or 3 billion dollars in 1939 to 3.9 billion dollars in 1944. Two billion came from North American countries and 900 million from South American.

Exports during the first quarter of this year declined and imports increased. After lend-lease ends, exports cannot, of course, continue at such a disproportionate rate to imports.

So far as agricultural products are concerned, exports in 1944 were largely processed goods. There were 555 million dollars worth of meat, 115 million dollars of manufactured cotton, 260 million dollars of dairy products and 16 million dollars worth of wheat, to mention the leading processed items.

Quantities of specific items exported in 1944 include 1,061,516 bales of cotton, 280,189,000 pounds of tobacco, 10,029,000 bushels of wheat, 10,231,000 bushels of corn, 510,000 bushels of apples, 5,536,479,000 pounds of meat products, 858,432,000 pounds of lard, 260,372,000 pounds of dairy products excluding fresh milk, 16,916,000 barrels of wheat flour and 32,131,000 pounds of sugar. Along with this went \$165,312,000 worth of agricultural machinery.

Imports are largely made up of raw silk, wheat, bananas, cocoa, coffee, vegetable oils and sugar. Wheat, vegetable oils and sugar are the only agriculturally competitive crops of the United States. As shipping permits are increased, competitive imports will, of course, increase.

Apparently agricultural products of the United States will have to depend upon how well private industry can supply world needs unaided by lend-lease, and upon how well private industry can keep up employment of consumers in this country. Some believe that several years of business activity are in store. Agriculture will follow business trends but it is quite evident that there will be a leveling down from wartime peaks.

Urges Farmers to Get Phosphates Early

J. Ward Wood, chairman of the West Virginia State AAA Committee, is urging farmers to get phosphates this fall for application in the spring, according to an Extension Service news release.

Phosphate, supplemented by lime, has been a major factor in helping farmers to produce more and better food during wartime. The nation's nutrition has been maintained at a high level, despite the heavy strain which all-out production has placed on the soil. Every year large quantities of phosphorus are taken from the soil in food and feed crops. For example, a 1,500-pound steer contains as much of this nutrient as is in a 100-pound bag of 20 per cent superphosphate. The only way of returning this vital mineral to the soil is by supplying superphosphate or mixed fertilizer containing phosphorus. Since people receive their phosphorus through food, naturally the products from soils rich in this and other minerals are the most nutritious.

In West Virginia, the AAA has stressed the use of phosphate on pastures and hay land. Phosphate, when used as a top-dressing for pasture and hay land, enables legumes and grasses to crowd out weeds and the poorer species.

The supply nationally for the fiscal year 1945-46 will be about 12,500,000 tons of all kinds of fertilizer. Not more than 8,000,000 tons can be delivered from January to June of next year. This leaves 4,500,000 tons to be delivered to farmers from July to December of this year. Manufacturers will not find it possible to provide such a large tonnage, unless a great portion of their output can be moved this summer and fall. Mr. Wood urged farmers, therefore, to secure as large a portion as possible of their needs this fall especially that intended for early spring use.

Sources of Nitrogen for Pasture

Reporting source-of-nitrogen tests on pastures, the Georgia Experiment Station says in its most recent Annual Report that nitrate of soda gave the largest increase in Bermuda grass production. Ammonium nitrate, however, gave good increased production at less cost, and ammonium sulphate gave nearly as much increase as ammonium

nitrate. "The use of practically any source of nitrogen on grass pastures should prove highly profitable at present where increased feed production is needed," the report states.

Fertilizer Restrictions Lightened

Not all fertilizer regulations growing out of the war are to be regarded by consumer or manufacturer as good riddance when discontinued. Restriction of grades, or analyses, recommended by federal and state agronomists, for instance, are based on studies of crop needs and soil conditions, war or peace. The fewer the grades, the fewer the readjustments which the manufacturer has to make, and the less his production cost. Then, too, the wartime regulations called for the production of fertilizers of relatively high plant food content, desirable from the fertilizer manufacturer's viewpoint in savings on freight, handling and packaging, and from the consumer's standpoint in savings on freight and handling per unit of plant food applied to the soil.

Maintenance of high analysis fertilizers is, therefore, desirable and any relaxation in this particular is to be guarded against, particularly at this time when transportation difficulties call for saving every possible pound of haulage.

No one, of course, wants any regulations that will bar the use of any desirable material, high or low in plant food content. Restrictions can bar competition and establish higher than essential prices. Fertilizer manufacturers and farmers have a common stake in getting fertilizer materials at lowest possible costs. The economic trend, however, for fertilizer manufacturer and farmers, is toward the highest practical plant food content of fertilizers. This is why it is desirable to hold on to the high grades established during the war.

As long as the war continues and the War Production Board continues to function, fertilizer manufacturers and farmers will have to be content to use the plant food materials made available. The restrictions lifted have to do with trade in mixed goods and materials rather than in changes of available materials, and consumers who may want variations in grades should be informed that the materials available do not admit of radical changes in analyses.

Consumer Cooperative Growth Challenges Profit Business*

By HAROLD E. GREEN

The consumer cooperative movement was 100 years old this month. The date of its establishment by the Rochdale weavers in England, December 21, 1844, marks the definite emergence of a strong challenge to the profit system.

The cooperatives in this country seem to be on the threshold of an unprecedented development, both at home and abroad. Since 1937 the dollar volume of goods and services provided by consumer co-ops in this country has more than doubled; organization membership is up more than 50 per cent; there are ambitious plans for postwar trade with cooperatives of other nations. The importance of the movement can no longer be depreciated by saying that it plays an inconspicuous part in business.

Two and one-half million members strong,¹ the co-ops have the endorsement of the top labor unions and of many church and educational groups.

The CIO, AFL, Federal Council of Churches of Christ in America, National Catholic Rural Life Conference, Central Conference of American Rabbis, the Grange, Farm Bureau Federation, National Farmers Union, National Education Association and Progressive Education Association have all endorsed the consumer co-op movement. There are more than 320 student cooperatives on nearly 200 college and university campuses (with approximately 110,000 students) doing a business estimated at \$3,750,000 a year.

*Reprinted from "Printers' Ink."

The recognition accorded the cooperative leaders by the present administration in Washington has been marked: in 1936 the President sent a commission of six to Europe to study co-ops and their report (1937) is a classic; and this year Murray D. Lincoln, president of the Cooperative League of the U. S. A., was chosen as the lay delegate to the United Nations Food Conference because of his leadership in agricultural circles and in cooperative purchasing.

The scope of the co-ops is indicated by these facts and figures:

One-sixth of all farm supplies purchased in the United States are handled by cooperatives.

Almost 1,000,000 farm homes get their light and power from some 800 cooperative rural electric associations.

3,100 cooperative stores sell food to consumers, and more than 1,000 specialize in co-op label groceries.

1,500 co-op service stations sell gas and oil to 500,000 patrons.

500,000 persons have insured their lives, cars, or homes in consumer-owned insurance companies; and 6,000,000 persons have insured their farm property in small insurance mutuals.

Today about 55 per cent of the marketing co-ops include some kind of purchasing service.

According to Joshua K. Bolles's recent book, *The People's Business*, a consumer

SHOULD PLAY THE GAME WITH THE SAME RULES

A prominent representative of the fertilizer industry says of the Co-ops:

"As far as Co-operatives are concerned nobody in the fertilizer industry has any fault to find with them except that they are tax exempt. If they expect to operate in our free economy, they should play the game according to the same rules that govern everybody else. You can't play a football game with two sets of rules, one for each of the opposing teams; neither can you operate under our system of Government with a double standard, so to speak."

living in New York City can live in a co-op apartment, eat in a co-op cafeteria, buy his groceries and books in local co-ops, and his shirts, socks, ties and other incidentals from a co-op mail-order house. He can smoke co-op cigarettes or pipe tobacco; clean his teeth with co-op tooth paste, listen to a co-op radio; insure his car, his apartment furniture and his life in a cooperative insurance company; get medical care and hospital insurance through a group health cooperative—and be buried by a co-op.

The largest section of the consumer cooperative movement is in rural America and is built on the distribution of farm supplies. This development began in the middle 1840's and received its greatest impetus after World War I, when prices of farm products toboganned but prices of farm supplies remained close to their previous levels. Farmers then took the lead in putting the cooperative idea to work on a large scale. They found they could buy their feed and fertilizer and a great many other farm supplies through their own organizations. They figured that they had a right to go into business and to determine how the profits should be distributed. Now consumer cooperatives are the biggest single factor in the distribution of farm supplies. Paralleling this, but not growing as rapidly, has been the development of urban co-ops.

With these facts before you, don't you think that consumer cooperative principles and methods are being received more fav-

¹This is the number of members and patrons represented by National Cooperatives, Inc., and The Cooperative League of U. S. A. The former is made up of sixteen wholesale co-ops in the United States and Canada, and it sparks purchasing and manufacture. The League works with this group closely, seeks to unify and coordinate the entire movement, and may be termed the advertising agency of consumer cooperation as it supplies educational and promotional materials, sponsors and directs national educational conferences, and operates and maintains Rochdale Institute, a school specializing in the technique of carrying on cooperative business enterprise and the philosophy and program of the consumer movement.

Enterprises organized as cooperatives of one type or another, and not strictly profit-making ventures, will do almost a \$5,000,000,000 business in 1944. The National Tax Equality Association lists 13,525 local cooperatives with 4,584,000 members, 578 regional associations (wholesales) and 10 "super-cooperatives." This, they say, is exclusive of rural electric co-ops, credit unions, telephone associations, medical co-ops, insurance groups and many other forms of mutual organizations; but it includes marketing as well as consumer cooperatives.

A very difficult aspect of the co-op movement is the functions of the various co-ops and their relationship to each other.

orably by consumers than most businessmen imagine?

The principles and methods by which most co-ops operate are:

Principles

1. Democratic control, each member having only one vote, regardless of capital investment.
2. Open membership, anyone being eligible to join, regardless of race, religion or politics.
3. Invested money, if interest-bearing, receives a fixed percentage, not more than the prevailing current rate.
4. Net savings (profits) are returned to patrons on the basis of purchases made.

Methods

1. Voluntary membership.
2. Business for cash only. (Most co-op failures have been caused by adopting credit.)
3. Non-members can become members by allowing their refunds to accumulate toward the purchase of an initial share of capital.
4. A portion of the savings (profits) shall be used for educational purposes in the field of cooperation.
5. Goods and services are sold at prevailing market prices.
6. Adequate operating reserves.
7. Fair treatment of labor.
8. Strong cooperation with other cooperatives.

In the opinion of some cooperators (who are not appreciably represented in the leadership of the movement), the ultimate purpose of the cooperatives is to replace profit business with a cooperative economy embodying these principles and methods. Because of this the co-ops seem, to some critics, a distinct threat to the American system of doing business.

Because of their ideological and anti-profit-business policies, the co-ops are now facing or forcing fights on at least four economic fronts:

- I. With the National Tax Equality Association, which urges the taxation of cooperative enterprises.
- II. With local profit-business interests over the acquisition of production and manufacturing facilities.
- III. In advocating grade labeling.
- IV. In the proposed development of an international cooperative trading organization, which is opposed as a cartel.

Spearheading the fight for businessmen is the National Tax Equality Association, or-

(Continued on page 22)

Personal Mention

Donald W. Aitken, assistant to the chief, Agricultural Adjustment Agency, who has been in charge of the contracts and shipments of fertilizers purchased and distributed by the Agency for several years, has severed his connection there and will be engaged in handling fertilizer materials on his own account in the Middle West. His present address is P. O. Box 1006, Arlington, Va. He will be succeeded in the Agency by *Roland Crumpler*.

Howard A. Rollins, formerly extension fruit specialist, has been named professor of horticulture and head of the plant industry work at the University of Connecticut, and will be in charge of all University teaching, research, and extension work in pomology, vegetable and landscape gardening, floriculture, agronomy, and forestry.

Dr. Alvin J. Cox, chief of the Bureau of Chemistry, California Department of Agriculture, will retire on August 31st under the civil service rules of the state. Dr. Fox, who has been in charge of fertilizer control for many years, leaves this office with the best wishes of his many friends in the California fertilizer industry. His successor will be selected by examination on August 25th.

Chester S. Edwards, president, Nitrogen Products, Inc., New York, has been appointed a member of the WPB Nitrogen Producers Advisory Committee to fill the vacancy caused by the resignation from the Committee of *Walter Liebner*.

Warren C. Huff, agronomist with the Coke Oven Ammonia Research Bureau in the northeast area, has transferred his head-

quarters to the main office in Columbus, Ohio, 3430 A. I. U. Bldg., 50 West Broad Street. His territory will remain the same.

J. E. Nunnally, who has been connected with the Chemicals and Fertilizers Branch, Office of Materials and Facilities, first in the southeastern area and more recently in the Washington office, has resigned effective July 31st.

June Sulphate of Ammonia

A drop of 7.6 per cent in the output of by-product sulphate of ammonia during June is recorded by the U. S. Bureau of Mines. While about half of this decrease is accounted for by the shorter month, the figure is still about 4.3 per cent below that for May, 1944. Production for the first half of the year was 2.5 per cent below the same period of 1944. For the first time in several months, sales were less than production with the result that stocks on hand at producing plants increased 10.6 per cent to 24,612 tons—still a relatively small reserve supply.

	Sulphate of Ammonia Tons	Ammonia Liquor Tons NH ₃
Production		
June, 1945.....	63,962	2,281
May, 1945.....	69,218	2,427
June, 1944.....	66,806	2,433
January-June, 1945.....	397,566	14,232
January-June, 1944.....	407,792	15,964
Sales		
June, 1945.....	61,839	2,122
May, 1945.....	75,985	2,208
June, 1944.....	42,554	2,333
Stocks on hand		
June 30, 1945.....	24,612	672
May 31, 1945.....	22,252	659
June 30, 1944.....	69,300	705
May 31, 1944.....	45,236	731

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FERTILIZER MATERIALS MARKET

NEW YORK

Little Change Reported in the Fertilizer Material Market. Demand for Chemical Materials Continues with Some Slackening in Sales of Nitrate of Soda. Organic Ammoniates Practically Out of Fertilizer Market.

Exclusive Correspondence to "The American Fertilizer"

Sulphate of Ammonia

The output of sulphate of ammonia is falling below the levels of the past year. Demand continues good and most material is being taken on contract. It is reported that some export inquiries have been received.

Nitrate of Soda

There has been little change in the nitrate of soda situation. The supply is adequate for current demand, which is naturally dropping off somewhat as the season advances. With the opening of European markets, it is expected that production in Chile will be increased.

Organic Ammoniates

The continued short supply of all types of organics and the increased demand from feed manufacturers have left poor prospects for the fertilizer manufacturer. Inquiries are still being made but very little material gets to the fertilizer mixer.

Superphosphate

The labor shortage still continues to be the controlling factor in the present output of superphosphate. Plants are running to their labor capacity and the year's production should show an increase as mixers are taking their supplies earlier than usual so as to build up a reserve for the opening of the mixing season.

Phosphate Rock

The transportation problem has gone a long way toward solution and shipments are proceeding both by rail and boat. In addition to heavy domestic demand, there is a considerable amount being sent abroad.

Potash

There has been no change in the potash picture. Plants are continuing at capacity production and fertilizer manufacturers are

receiving their supplies regularly on contract. There is some speculation as to the production to be expected this year from the mines in France and Germany but European agriculture will probably take all that can be produced.

CHARLESTON

Subsidy on Imported Organics Considered. Nitrogen Solutions and Nitrate of Soda in Better Supply. Castor Pomace Scarce.

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, August 4, 1945.

The consumption of fertilizers in the seventeen states reporting was more than eight million tons, about 500,000 tons above 1943-44.

Organics.—The tight situation on this continues and the Government is considering the idea of paying a subsidy in order for importers to bring in blood and tankage from South America, not especially for fertilizer purposes, but mainly for feed.

Nitrogen Solutions.—Over six hundred cars of this material were delivered during the month of July.

Nitrate of Soda.—The demand for this has been somewhat above the usual, with the necessary supply available.

Castor Pomace.—The situation in this market has not improved. Producers have only been able to ship on contracts and are not in position to offer additional.

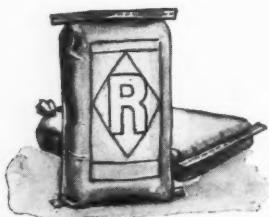
In its report on the sale of surplus chemicals up to May 31st, the Reconstruction Finance Corporation lists several items of fertilizers and fertilizer materials. The proceeds from the sales of the above items totaled \$22,190, as compared with \$22,174 which the Government had expended for the same materials. Fertilizers and materials costing \$5,450 were still on hand for future sale.



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Campbell Soup Issues Tomato Soil Monograph

The Campbell Soup Company has issued the first of a series of research monographs from their Department of Agricultural Research. Prepared by Jackson B. Hester, Soil Technologist, this 46-page booklet, entitled "Fundamental Studies on Some Tomato Producing Soils," deals with the chemical problems of soils from the standpoint of plant nutrition. The results of the experiments, as given in the summary, were as follows:

Eleven different soil types, seven from the Coastal Plain of New Jersey, two from the sandstone and shale belt of New Jersey, one from Ohio and one from Illinois were brought to the greenhouse in Riverton, N. J., and placed in 3-gallon pots for study. The treatments consisted of (1) No treatment; (2) Fertilizer (12-24-24); (3) Lime; (4) Lime and fertilizer; and (5) Lime, fertilizer, and trace elements. Yield records were kept and analyses were made for sugars, vitamin C, titrable acids, and mineral and nitrogen content of the dried fruit. The amount of plant nutrients present in the soil, that taken out of the soil by the fruit, and that removed from the soil by leaching are summarized.

On the acid soils fertilizer increased the yield, but did not produce a satisfactory crop. Lime increased the yield, but did not produce a satisfactory crop. Lime and fertilizer greatly increased the yield and quality of the crop, but the most satisfactory crop was obtained when lime, fertilizer, and trace elements were added. Sulphur, in the quantity used, was not beneficial to the Ohio or Illinois soil.

Fertilizer increased the titrable acids in the fruit when used on the soil without lime

and lime alone decreased it. Fertilizer and lime, and fertilizer, lime, and trace elements improved the vitamin C, sugar and general quality of the fruit in most cases.

An average of the mineral and nitrogen content of the dried fruit produced on the lime and fertilizer and lime-fertilizer-trace elements pots for all soils discussed is as follows: Calcium—0.050; Magnesium—0.115; Potassium—1.40; Calcium-magnesium-potassium—1.465; Phosphorus—0.40; and Nitrogen—2.00 milli-equivalents per gram. It is believed that this has some significance in connection with fertilizer practices in tomato growing.

Subsidy Proposed for Tankage and Blood Imports

In order to remedy the critical shortage of packing house by-product materials for the feeding industry, the U. S. Department of Agriculture has been considering a plan for subsidizing the importation of these materials from South American sources.

In a normal year, this country receives about 50,000 tons of tankage, dried blood and other animal by-products from South America. During the war, this supply was curtailed by the lack of shipping facilities. Now that the Atlantic sea lanes are again safe, new difficulties have arisen. As a result of drought and decreased slaughtering, the available supply has been greatly curtailed in Argentina, the principal source of such imports. Consequently, an official of the Department of Agriculture predicts that imports of packing house by-products will be only about half the normal amount.

Moreover, with the opening of the European market, British and French buyers are contracting for large amounts of materials at prices that are above the ceilings in this

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country. The Department feels that the only way to solve this problem and obtain a fair share of the available supply is by means of a Government subsidy on such imports, which would enable American firms to meet the higher prices now prevailing in South America. Even with this assistance, it is doubtful whether adequate amounts of organics can be obtained, and it is certain there would not be enough to bring any help to the fertilizer industry, as imports would all be of feeding grade and would go to the feed industry.

Fertilize Grains Before Planting

"Unless small grains are planted after such liberally fertilized crops as cotton and tobacco, they should receive fertilization before planting," says Enos Blair, North Carolina extension agronomist at State College.

Where legumes have been turned under, the recommendation is 300 pounds of 0-12-12 or 0-14-7 per acre. After corn or hay crops, small grains require a complete fertilizer. The recommendation for the Coastal Plain section is 300 pounds per acre of 4-10-6 or 4-8-8 and for the Piedmont and Mountains, 300 pounds per acre of 3-12-6 or 4-12-4.

In discussing small grain fertilization, Blair cited an outstanding demonstration conducted by Roland Salter of Carteret County with oats. The plot without any fertilizer produced 31 bushels per acre. An application of 300 pounds of 4-10-6 per acre at planting produced 36 bushels; a topdressing of 150 pounds of nitrate of soda on March 1st and no fertilizer at planting, 53 bushels; and both fertilizer at planting and the nitrate of soda topdresser, 63 bushels per acre.

On the high plot of 63 bushels per acre, with oats valued at one dollar per bushel, the total profit from the fertilizer treatment was \$24.00 per acre.

Doing a Good Job in California*

By WILL R. FORKER

Encouraged not only by higher farm income but by various Government programs in connection with the war food effort, demand for fertilizers during the past three years has been unprecedented and manufacturers all over the nation have been called upon to distribute a greatly increased tonnage. Despite shortages of primary materials and labor difficulties, they have done a remarkably good job of getting these fertilizers to the farms.

Early in the war period, nitrogen and potash were placed under an allocation system by the Government. As elsewhere in the nation, the manufacturers in California have had to rely on allocations of nitrogen and potash from the War Production Board, which have represented all of these materials available for distribution to the farms. Demand has continued to exceed the amounts allowed. In some cases, special additional WPB allocations were secured for certain essential crops. When growers were able to obtain extra material in one season and not in the next, the distribution efforts of the fertilizer manufacturers were criticized. It should be clear to all, however, that the decision in these cases rested with the War Production Board and not with the fertilizer companies.

Phosphate materials escaped being allocated but the demand for single and treble superphosphate has far exceeded the available supplies. California manufacturers have had to deal with a very serious situation. Much of their prewar supply of phosphate materials was diverted by primary producers to other

*Reprint from "California Cultivator, April 28, 1945.



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Back up our fighting men who have won one war—and are out to win another! Use selective resolicitation to step up your Payroll Savings Plan—tighten the rein on inflationary tendencies—build peacetime prosperity.

The Treasury Department acknowledges with appreciation the publication of this message by

*This is an official U. S. Treasury advertisement prepared under the auspices of
the Treasury Department and War Advertising Council*

places and superphosphate plants in this state, while operating at their fullest possible capacity consistent with the limited available labor supply, could not begin to meet the demands of this and other Pacific Coast states.

Because of restricted supplies of fertilizers, it is not strange that growers who could not get the kind of material they wanted, in quantities they wanted, at the time they wanted it, have expressed dissatisfaction.

Farmers who formerly bought five or ten tons per season want carloads, and many, who did not use fertilizer at all, have found it profitable to apply many tons.

There has been considerable criticism to the effect that fertilizer manufacturers are using all of their supply of primary materials in the preparation of mixed fertilizers and are not distributing the simple materials, such as sulphate of ammonia, nitrate of soda, superphosphate and sulphate of potash, as they did in the past. If this were true, it would be a serious accusation but it is not true. Mixed fertilizers have always been an important part of the business and remain in this position now. Only misinformed persons will make the statement that simple materials are not being distributed in large volume to the farms. An examination of the following tabulation, which is based on California state fertilizer tonnage reports, will show that the distribution of plant food in the form of simple materials in 1944 was in the same proportion to the total tonnage sold in the state as it was in the prewar years of 1935-1939.

Kind	Yearly Av. 1935-1939	1944
	Tons	Tons
All fertilizers		
Total State Tonnage.....	209,136	417,893
Nitrogen (N)		
As simple materials.....	18,185	35,650
Phosphoric Acid (P_2O_5)		
As simple materials.....	5,585	14,562
Potash (K_2O)		
As simple materials.....	1,109	1,157
Total distributed		
As simple materials.....	24,879	51,369

"Small Grains Need Fertilizer"

An eight-page, illustrated letter-size pamphlet entitled "Small Grains Need Fertilizer" has been issued by the National Fertilizer Association for use of members in promoting the use of fertilizers on small grain. Only 12.6 per cent of small grain acreage is fertilized in this country, according to the pamphlet.

Experiment station results with fertilizers in all parts of the country are given and contrasts are shown by photographs of fertilized and unfertilized fields of grain.

The pamphlet also stresses the selection of the best varieties, treating the seed for disease control, conducting germinating tests, preparation of seed bed, as well as the kind and quantity of fertilizers to apply.

The pamphlet lends itself to an over-print of the name of the distributing firm.

Liberal Fertilization of Pasture Plants

"Pastures should receive liberal fertilizer treatment," the New Jersey Experiment Station says in *Circular No. 492* entitled "Improved Pastures from Better Grasses and Legumes." Following the recommendations of grass and legume mixtures for varying soil conditions, the circular says:

"Lime should be applied to raise the pH of the soil to about 6.5. Normally, this means at least one ton per acre.

"When the mixture is seeded in August, following a crop not heavily fertilized, it is best to apply 500 to 700 pounds of a 5-10-10 or 4-12-8 fertilizer per acre. Should the

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seeding follow a heavily fertilized crop, the use of 300 to 500 pounds of 20 per cent superphosphate or of 300 to 500 pounds of 0-14-7 or 0-12-12 is justified.

"If the seeding is made with a small grain crop it is suggested that 300 to 600 pounds of 0-14-7 or 0-12-12 fertilizer be broadcast before plowing or applied with a disk drill immediately after plowing. The amount is in addition to that used for the small grain crop.

"Where boron may be deficient, an addition of 10 pounds of borax per acre on light soils and 20 pounds on heavy soils, but the suggested application should be made once every year."

Fertilizers Boost Tobacco Yields

In tests at the Western Kentucky Experiment Substation at Princeton from 1929 through 1944, dark-fired tobacco produced an average of 851 pounds to the acre on land receiving no lime or fertilizer, and 1,247 pounds where limestone, phosphate and moderate applications of potash and nitrogen were made.

At a field which the Kentucky Experiment Station has at Mayfield, untreated land produced 937 pounds of dark-fired tobacco to the acre and treated land 1,373 pounds, as an average for the years 1915 through 1942.

Untreated land at an experimental field at Campbellsville produced 867 pounds of burley tobacco to the acre from 1922 through 1944, and 1,301 pounds where limestone, phosphate, potash and nitrogen were applied.

Untreated land averaged 433 pounds of burley tobacco and treated land 1,137 pounds from 1938 through 1944, at the test field at Greenville.—*Kentucky Extension Service.*

Cotton stocks in this country at the end of June are estimated at 12,032,000 bales, with 57 per cent of the total held by the Government.

CONSUMER COOPERATIVE GROWTH CHALLENGES PROFIT BUSINESS

(Continued from page 13)

ganized in 1943 and said to represent 1,000,000 individuals through company and trade association affiliations. The NTEA says that Government in business and cooperative business threaten "free enterprise . . . and the entire private business structure . . . Both these types are expanding rapidly. Both occupy a privileged position . . . because:

"1. They pay little or no federal tax, and are favored by the tax laws of many states. (Complete exemption from federal income tax, excess profits tax and capital stock tax is granted to numerous specified types of organizations and cooperative mutual and governmental businesses by Section 101 of the Internal Revenue Code. In addition, other types are subject to federal income taxes, but under administrative and court rulings are not required to pay taxes on earnings distributed in the form of patronage dividends.)

"2. They enjoy cheap and favorable credit from Government, especially through lenient treatment under anti-trust laws and credit at 1 1/4 to 4 per cent through the 13 banks for cooperators.

"3. Their growth is promoted with tax money supplied in part by private business.

"4. They are 'preferred' in business dealings with governmental agencies.

"5. They enjoy special privileges under many business regulatory laws.³

"Some estimates go as high as a billion dollars in the amount of federal revenue that might be raised . . . by taxing the tax-exempt competitors of private business. They are expanding at a rate ten times faster than possible for businesses that are privately or corporately owned. Under the impetus of such exemption super-cooperatives . . . are out to produce . . . all that consumers require."

³A corporation organized for profit, if its net income is more than \$25,000, must pay a normal and surtax of 40 per cent of net earnings. It must also pay an excess-profits tax at a 95 per cent rate over and above what are classed as normal earnings.

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The co-ops reply to the NTEA charges of special tax privilege by pointing out that they pay all taxes required of them by law. This includes all taxes paid by private business except income tax, in most cases. All urban co-ops pay taxes on undistributed savings. (The Consumers Cooperative Association of Kansas City, for example, paid \$1,630,701.98 in taxes for the last fiscal year. Its 792 member co-ops paid an additional \$4,000,000.)

As for patronage refunds, R. Wayne Newton, manager of the National Association of Cooperatives, says:

"Neither the Internal Revenue Bureau nor Congress itself has the power under the 16th amendment to tax as income that which is not income, but that is exactly what NTEA has set out to do. There is nothing in the present federal tax law which extends any substantial privilege to cooperatives. Any business that is willing to return its entire accumulation of surplus (profits) to its patrons can enjoy the same tax advantages."

The United States Tax Court recently upheld the right of cooperatives to pay patronage savings either in cash or in stock tax-free. The Commissioner of Internal Revenue, acting for the Federal Government, had sought to collect income taxes on the gross income of United Cooperatives for the years 1937, 1938 and 1939.

The tax stand of the co-ops is set forth in a resolution passed at the recent Cooperative Congress in Chicago (P.I., Oct. 20, 1944, p. 104), which said in part:

"We believe that all taxation should be based strictly on the needs of the people to serve themselves adequately through their Government. Furthermore, we believe that ability to pay should be the basis of any tax program and that it be reflected in adequate and equitably graduated income taxes, supplemented if necessary by selected sales taxes on so-called luxuries and other non-essentials; upon commercial amusements, and upon gifts, inheritances and intangibles.

"We oppose general retail sales taxes, poll and payroll taxes and any other forms that place an unjust or inequitable penalty on the necessity to use or consume."

The co-ops claim that the NTEA attack misleads the public as to their tax position.

Two questions are now being raised among legislators and government officials.

1. Are some business groups abusing the laws that give tax exemption and other privileges to cooperative organizations?

2. Should the powerful, rapidly growing

super-cooperatives continue to benefit from devices originally designed to help farmers operating on a localized basis? How big is bad?

Post War Plans

Immediate postwar expansion plans of the co-ops here at home call for doubling present income through existing facilities, rounding out the goods and services provided by each individual unit, and obtaining more members. For example, the Eastern Cooperative League and wholesale is taking steps to increase its membership from 44,000 to 122,500 by 1949 and to increase annual retail co-op store volume from \$14,000,000 to \$38,625,000. A plan for raising the educational budget from \$31,300 to \$112,700 is under consideration and so is a program for the establishment of one-stop super-service retail food outlets.

The entry of U. S. cooperatives into foreign trade this year has the approval of the administration in Washington and of representatives of other nations. The co-op foreign activity includes:

1. Establishment of a federation of cooperative wholesales here and abroad (an International Cooperative Trading and Manufacturing Association) to handle petroleum products and food and related supplies.

2. Establishment of a \$150,000 Freedom Fund by the Cooperative League to rehabilitate cooperators and cooperatives in war-torn countries overseas.

3. Close cooperation with United Nations Relief and Rehabilitation Administration in rehabilitation work.

Shun Monopoly

Howard A. Cowden, chairman of the Cooperative League's committee on International Cooperative Reconstruction and president of the Consumers Cooperative Association of Kansas City, says: "World

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Information and references available on request.

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See Page 4



trade after the war will be largely in the hands of private profit and Government-managed cartels, either one of which left to its own devices contains dangers for political democracy, unless powerful federations of cooperatives are created to check and balance them in the international field."

The International Cooperative Alliance, London, has been invited to hold its triennial conference in 1946 in the United States, preferably in the Middle West. The Alliance is a 50-year-old federation of 124,000 cooperative societies in 39 countries, with 100,000,000 members before the war.

Goods (mostly oil and food) have been exchanged between cooperatives here and abroad in the past but not on the extensive scale now proposed.

Last year the cooperatives became the largest single independent petroleum operator in the country by purchasing the \$5,000,000 Globe Oil and Refining Company and the \$4,000,000 National Refining Company. Savings of 1 cent a gallon in gasoline retailing, $\frac{1}{2}$ cent in wholesaling, and $2\frac{1}{2}$ cents in producing and refining have already been effected. Within 15 or 20 years the cooperators expect to be the largest individual factor in the oil business by achieving further economics through integrated operations. Eight large cooperative groups now own almost 600 oil wells, nine refineries and 1,200 miles of pipe lines, and do approximately \$200,000,000 business in oil annually.

An international refinery is proposed to cost (maximum) \$12,160,000, with \$8,269,980 to be financed by the co-ops (20 per cent underwritten by American co-ops and the remainder by co-ops in England, Scotland, Sweden, Denmark and other countries), and less than a third to be borrowed. Texas has been suggested as a possible location, with the oil moving through co-op pipe lines and by co-op tankers.

A capital of \$100,000 is suggested for the international food division, but these figures are based on the assumption that only for a short time it will function on an agency commission basis. Later, with experience and growth, the food division is expected to become something more than a mere broker between shippers.

It is estimated that in 1936 consumer cooperative wholesales in Europe drew goods from the United States worth \$40,000,000. In the next three years, this volume was increased somewhat. Prewar statistics show that European cooperatives handled 10 per cent or more of the food trade, and this 10

per cent is the amount of business that American cooperatives are counting on when primary relief is over and rehabilitation begins.

However, the American cooperatives alone cannot put this plan into effect. That can be done only in conjunction with the International Cooperative Alliance or the International Cooperative Society, both with headquarters in London.

UNRRA may be asked to provide a fund of \$50,000,000 to loan to foreign co-ops after the war, as many of them will lack capital.

Societies affiliated with the International Cooperative Alliance did 33 billion dollars worth of business yearly before the war, including housing, banking and insurance. In Europe in 1939, there were 288,000 producer and consumer societies with 53,000,000 members. The British consumer societies with 9,000,000 members represent half the total families of Great Britain and supply more than 25 per cent of the country's food. In Denmark the cooperatives handled 91 per cent of the milk and slaughtered and packed 86 per cent of the meat of the country. Sweden has more than 40 per cent of its people in cooperative membership. Before the war, consumer cooperative societies in Finland did 33 per cent of the wholesale and retail business. At the beginning of 1943, China had 170,000 cooperative societies, with 10,000,000 members. In 1939, there were 105,160 cooperative societies in India.

In Latin America the consumer co-ops are making consistent progress, especially in Brazil. There the government is actively encouraging their formation. At present there are 1,730 producer and consumer co-ops with a membership of 270,000.

Of prime importance to the postwar development of international trade in this country is the attitude of the Federal Government. In a letter to Murray D. Lincoln,

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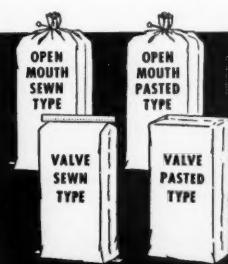
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president of The Cooperative League, U.S.A., in January of this year, President Roosevelt said:

"The weavers of Rochdale who founded modern cooperative enterprise balanced independence with interdependence, self-interest with good will and action with foresight. Any effective handling of the problem of relief and rehabilitation of the victims of Axis aggression must be based on these same considerations. The cooperative movement, which belongs to no one nation but has its roots in the traditions of all democratic peoples, is therefore one of the appropriate instruments to be used in this task."

Leon Henderson, chairman of the board, Research Institute of America, frequently mentioned as the man who will help direct relief activities in Europe after the war, sees that co-ops have an important part to play in maintaining the freedom of individuals in a world imperiled by cartelization. "Co-ops are definitely anti-authoritarian," he says. "They help in the redistribution of income. They're not afraid of social security, not afraid of democracy. They are a people's movement. They have a great opportunity in the exciting and exhilarating days to come."

* * *

Regardless of the outcome of its international plans or of the domestic controversy over taxes, consumer cooperation is here to stay. Its continued growth despite formidable opposition has been steady, and in recent years spectacular.

The great majority of leaders in the cooperatives (especially those in key positions) are interested in social welfare rather than personal aggrandisement. What decisions are made in the courts concerning co-op taxation and operations will probably be consistent with general welfare. As for the expansion intentions of cooperatives, their policy is specifically stated. Murray D. Lincoln, speaking at the Ohio Farm Bureau Federation annual meeting this fall, said:

"I doubt if cooperatives will ever want to handle more than 15 per cent to 25 per cent of certain commodities. We don't need to, in order to influence satisfactorily price, quality, and service. And we don't need a monopoly ourselves in any of these fields."

ALFALFA—THE ARISTOCRAT

(Continued from page 8)

dressing them with high-potash fertilizers after the first or second harvest.

Reveals Its Needs to the Chemist

A study of the conditions in 18 alfalfa fields located at widely scattered points in New Jersey revealed that most of the soils, and the alfalfa growing on them, contained adequate amounts of calcium, magnesium, and phosphorus, the only serious shortage being that of potassium. Thus, in four of these fields, alfalfa failed at the end of the second or third year of harvest for no apparent reason except that the potassium supply in the soil had been exhausted. On two other fields, also, a lack of potassium was a limiting factor, but in these cases it operated in conjunction with wilt and winter-heaving to kill the plants.

From our tests^{1, 2, 3} the conclusion was reached that the critical lower limit for available potassium in an alfalfa field is between 60 and 80 pounds per million pounds of soil, and that the potassium content of the crop at harvest time should not be less than 1.0 per cent of the dry matter. At such low potassium levels, however, the soil must be able to supply the alfalfa with considerably more calcium than would be required at higher potassium levels in the soil and plant.

Of 20 soils studied in detail, the Collington loam, Penn silt loam, Dover loam, Bermudian silt loam, Dutchess shale loam, Washington loam, and Chester loam had the greatest capacity to continue to yield potassium from their natural stores to the alfalfa crop, and the Lakewood sand, Whippoorwill silty clay loam, Sassafras sand, Gloucester

¹Bear, Firman E., and Prince, Arthur L. 1945. *Cation-equivalent constancy in the alfalfa plant*. Journal of American Society of Agronomy, Vol. 37, pp. 217-222.

²Bear, Firman E., Prince, Arthur L. and Malcolm, John L. 1944. *The potassium-supplying powers of 20 New Jersey soils*. Soil Science, Vol. 58, pp. 139-149.

³Mayernik, John J. 1943. *Alfalfa longevity in relation to nutrient supplies as measured by soil and plant-tissue tests*. Unpublished thesis, Soils Department, Rutgers University.

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loam, Papakating stony loam, Sassafras loamy sand, and Hagerstown loam had the least.

Responds to Use of Borax

In examining the question of other possible soil deficiencies, it was soon found that one of the most seriously limiting factors in alfalfa-growing is a lack of boron⁴. Some 12 per cent of the soils of New Jersey were shown to be lacking in this element. On such soils, an application of 20 to 40 pounds of borax per acre, applied as a top-dressing to established stands, frequently increased the yield of hay by as much as one ton. From careful studies of this problem the conclusion was reached that the amount of available boron should not be less than 0.35 pounds per million pounds of soil. Sassafras soils were conspicuously deficient in boron, whereas those of the Collington series were well supplied with the element. Crops growing on Lakewood, Penn, Gloucester, Merrimac, and Wethersfield soils were frequently benefited by borax applications, but those on the Dutchess, Washington, Dover, and Chester series were not.

Our present thought is that every ton of fertilizer sold in New Jersey should contain at least 5 pounds of borax, but that any fertilizer especially designed for use on alfalfa, on soils known to be deficient in boron, should carry extra amounts of this element. Thus we suggest that farmers in boron-deficient areas, especially those located on Sassafras and Penn soils, apply 10 to 20 pounds of borax per acre at seeding time and that they top-dress each acre of alfalfa yearly with 500 pounds of a phosphate-potash mixture containing 80 pounds of borax per ton.

It seems probable that other minor ele-

⁴Reeve, Eldrow, Prince, Arthur L. and Bear, Firman E. 1944. *The boron needs of New Jersey soils*. New Jersey Agricultural Experiment Station Bulletin 709.

ments are missing in many soils and that if they were supplied, the life-span and yield of the alfalfa crop would be further increased. The elements under suspicion are manganese, copper, zinc, and possibly molybdenum. As soon as manpower permits, studies will be undertaken by the New Jersey Agricultural Experiment Station to determine whether any one or all of these elements can be used to advantage either as a constituent of the fertilizer to be used on the soil, or as a spray to be applied to the growing crop.

Needs Branching Root in Humid Areas

As previously indicated, the disease known as "wilt" and the soil condition that results in "heaving" are two other problems facing many alfalfa growers. Wilt is widespread and is being overcome by breeding wilt-resistant strains, of which Ranger and Buffalo are among the most promising. Heaving is associated with high-rainfall areas and heavy soils and is being circumvented by selecting plants with branching root-systems, rather than the tap-rooted types, for seed production. Of the list, the Atlantic, developed in New Jersey, is rapidly gaining in popularity since it not only is less subject to being pushed out of the soil during spring thaws but it is remarkably tolerant to wilt and has shown very high yielding capacity. Lack of seed is the only deterrent to widespread use of these improved strains of alfalfa.

Potato Yields and Harvesting Cost

The more potatoes in the hill, the more the potato gatherer can harvest in a given time and the less the cost. Idaho U.S.D.A. Wage Board set a scale of 10 cents per 100-pound sack for yields of 200 sacks per acre with a scale advancing to 22 cents per 100-pound sack where yields are 69 or less sacks per acre. This indicates the importance of fertilizing for maximum yields.

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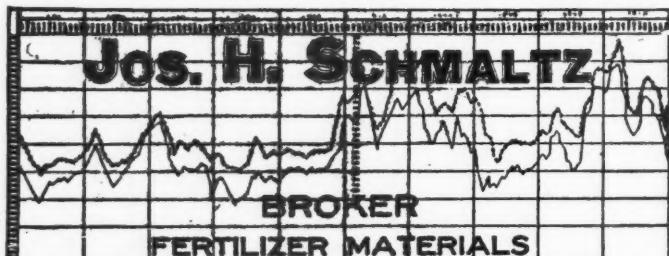
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